



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ALUMINUM PHOSPHIDE**

CAS Number: 20859-73-8

DOT Number: UN 1397

RTK Substance number: 0063

Date: February 1989 Revision: April 1998

HAZARD SUMMARY

- * **Aluminum Phosphide** can affect you when breathed in.
- * Exposure to **Aluminum Phosphide** can irritate the skin, eyes, nose and throat.
- * Breathing **Aluminum Phosphide** in high concentrations can irritate the lungs causing cough, wheezing and shortness of breath.
- * Repeated exposure may damage the lungs, kidneys and liver.
- * **Aluminum Phosphide** releases highly toxic *Phosphine* gas on contact with water or acids.
- * CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES FACT SHEET ON PHOSPHINE.
- * DANGEROUS and FLAMMABLE when wet.

IDENTIFICATION

Aluminum Phosphide is usually found as dark gray or dark yellow crystals. It is used as an insecticide or fumigant for grain.

REASON FOR CITATION

- * **Aluminum Phosphide** is on the Hazardous Substance List because it is cited by ACGIH, NFPA, DOT, HHAG, EPA and NIOSH.
- * This chemical is on the Special Health Hazard Substance List because it is **FLAMMABLE**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are recommended for all *soluble Aluminum salts* (measured as *Aluminum*):

NIOSH: The recommended airborne exposure limit is **2 mg/m³** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **2 mg/m³** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Aluminum Phosphide** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Aluminum Phosphide** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Aluminum Phosphide**:

- * Exposure to **Aluminum Phosphide** can irritate the skin, eyes, nose and throat.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Aluminum Phosphide and can last for months or years:

Cancer Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Aluminum Phosphide** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Aluminum Phosphide** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * Breathing **Aluminum Phosphide** in high concentrations can irritate the lungs causing cough, wheezing and shortness of breath.
- * Repeated exposure may damage the lungs, kidneys and liver.

MEDICAL

Medical Testing

Before beginning employment and at regular times after that, the following are recommended:

- * Lung function tests.

If symptoms develop or overexposure is suspected, the following may be useful:

- * Liver and kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Conditions Made Worse by Exposure

- * Persons exposed to **Aluminum Phosphide** should consult their doctor before taking *phosphorus* supplements contained in certain vitamins.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- * Where possible, automatically transfer **Aluminum Phosphide** from drums or other storage containers to process containers.
- * Before entering a confined space where **Aluminum Phosphide** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * In evaluating controls for this substance, be aware of the possibility of exposure to *Phosphine gas*, which is much more hazardous than **Aluminum Phosphide**.
- * Workers whose clothing has been contaminated by **Aluminum Phosphide** should change into clean clothing promptly.

- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Aluminum Phosphide**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Aluminum Phosphide**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Aluminum Phosphide**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Aluminum Phosphide** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
- * Use a vacuum to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Aluminum Phosphide**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear dust-proof goggles when working with powders or dust, unless full facepiece respiratory protection is worn.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filters and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency, 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- * If while wearing a filter, cartridge or canister respirator, you can smell, taste, or otherwise detect **Aluminum Phosphide**, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter, cartridge, or canister. If the seal is no longer good, you may need a new respirator.
- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters, cartridges, or canisters to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Aluminum Phosphide** you should be trained on its proper handling and storage.
- * Store in tightly closed containers in a cool, well-ventilated area away from STEAM, MOISTURE, WATER and STRONG ACIDS to prevent the release of flammable *Phosphine gas*.
- * Sources of ignition, such as smoking and open flames, are prohibited where **Aluminum Phosphide** is handled, used, or stored.
- * Wherever **Aluminum Phosphide** is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.
- * **Aluminum Phosphide** must be stored to avoid contact with MINERAL ACIDS since violent reactions occur and OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE)

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health and
Senior Services
Occupational Disease and Injury Services
Trenton, NJ 08625-0360
(609) 984-1863

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health and Senior Services physician who can help you find the services you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

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 OR LARGE SPILLS AND FIRES immediately call your fire
 department. You can request emergency information from the
 following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE (See page 3)

FIRST AID

- * **Aluminum Phosphide** is a **FLAMMABLE SOLID**.
- * **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Phosphorus Oxides* and *Aluminum fumes*.
- * **DO NOT USE WATER OR FOAM.**
- * Use dry sand, clay, dry ground limestone, or use dry chemical extinguishers.
- * If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Remove contaminated clothing. Wipe chemical off skin with dry towel or rag. Wash contaminated skin with water.

Breathing

- * Remove the person from exposure.
- * Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
- * Transfer promptly to a medical facility.

PHYSICAL DATA

Water Solubility: Reacts with water to produce *Phosphine gas*.

OTHER COMMONLY USED NAMES

Chemical Name:

Aluminum Phosphide

Other Names:

Aluminum Monophosphide; Phostoxin; Celphos

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES

Right to Know Program

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202